THE WARRIOR

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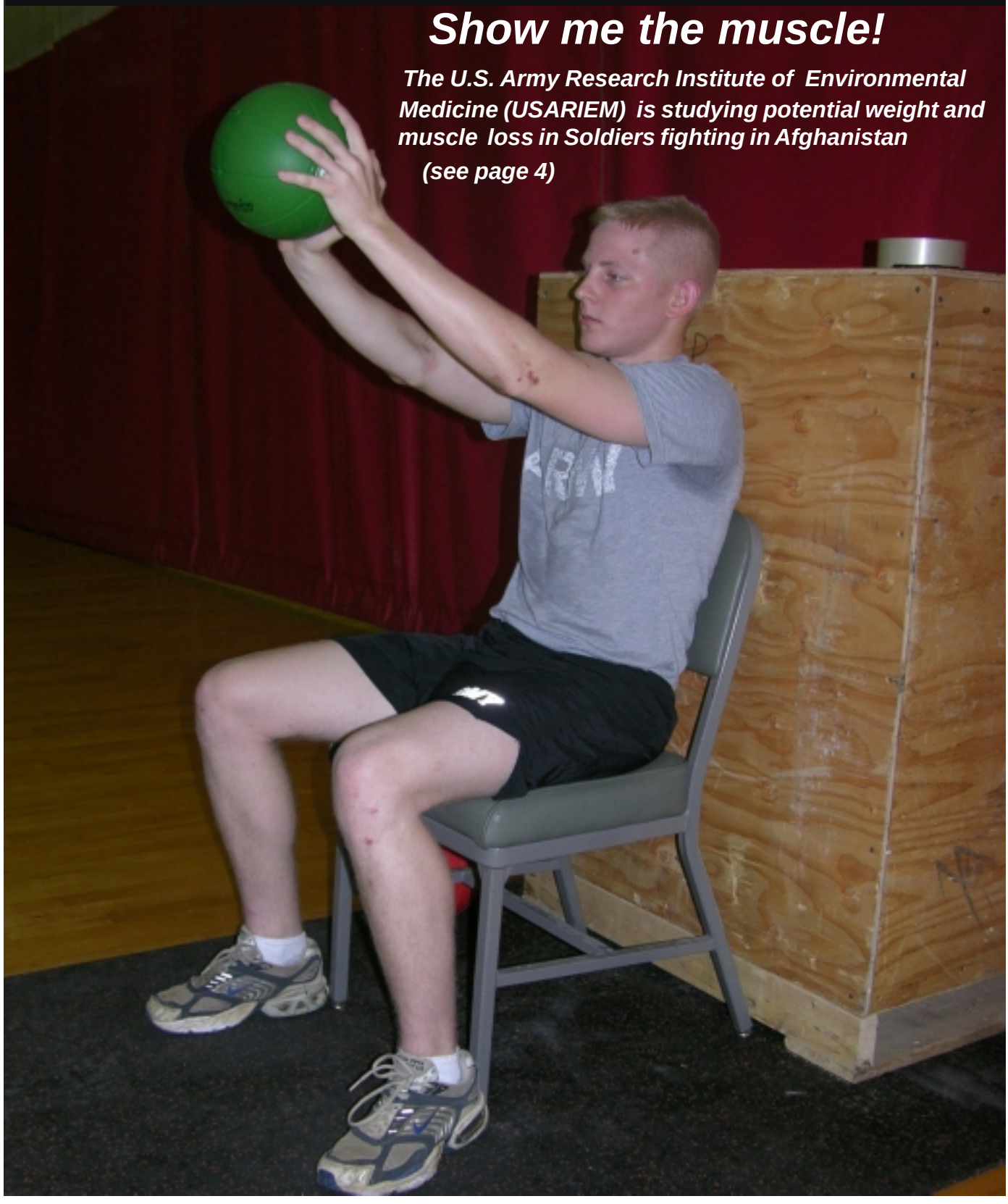
Show me the muscle!

The U.S. Army Research Institute of Environmental Medicine (USARIEM) is studying potential weight and muscle loss in Soldiers fighting in Afghanistan

(see page 4)



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Courtesy photo

Cover photo: To test upper body anaerobic power prior to deployment to Afghanistan, a Soldier prepares to throw a medicine ball from a seated position. The test is part of a data collection effort performed by the U.S. Army Research Institute of Environmental Medicine (USARIEM), along with the U.S. Army Center for Health Promotion and Preventive Medicine (CHPPM) and the Army Physical Fitness School.

THE WARRIOR
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Beveraging technology—Hot coffee anywhere, anytime

DoD Combat Feeding Directorate brings hot coffee to combat troops

By Jane Benson
Editor

Warfighters in Afghanistan and Iraq can enjoy a nice hot cup of coffee --thanks to scientists at the DoD Combat Feeding Directorate (CFD), part of the Natick Soldier Center.

Researchers from the CFD developed a Hot Beverage Bag (HBB), which is a re-sealable high-density polyethylene bag. The HBB provides a safe, easy and convenient method for Warfighters to heat water for coffee, tea, cocoa and other hot beverages by utilizing surplus flameless ration heaters (FRHs)--which are sometimes left unused in Meals, Ready-to-Eat (MREs)--and recycled MRE chipboard cartons.

The HBB enables Warfighters, who may be engaged in intense or extremely mobile operations where organized food service is not possible, a means to make coffee. The HBB may also be used for preparing hot water for sanitation (i.e., shaving and personal hygiene).

According to Stephen Moody, team leader for the Individual Combat Ration Team, the HBB is basically a plastic zippered bag with markings for different water levels (6, 8, and 12 ounces). The bag also includes instructions for heating beverages.

According to Moody, a few things prompted the creation of the HBB.

"It was noted during field evaluations that Soldiers often did not reconstitute their hot beverages--coffee, cocoa, or tea--because of the mess they would make in their canteen cup. This led to the idea for the inclusion of a bag that could also serve as a cup. Also, some Warfighters do not routinely carry a canteen cup," said Moody.

Moody said that the bag, which is used in conjunction with the flameless ration heater, creates a demand for unused FRHs thus reducing the number of surplus heaters and related waste disposal concerns.

"An FRH is included in every MRE. Since they are not always used to heat the entrée--there's not always time--there are often extra FRHs available," said Moody.

Response to the Hot Beverage Bag, which has been included with the MRE (one per menu) since 2005, has been extremely favorable. The ability to make hot coffee adds greatly to the quality of life for Soldiers deployed to war zones, such as Afghanistan and Iraq.

"The feedback to date has been overwhelmingly positive. This is a very simple, dependable and inexpensive addition to the ration that is an enormous benefit to the Warfighter. Not only does it give the Soldier the opportunity to enjoy a hot beverage, it also helps to keep them hydrated by encouraging additional fluid intake," said Moody.

The ability to make hot coffee adds greatly to the quality of life for Soldiers deployed to war zones, such as Afghanistan and Iraq.

Warrior/Underhill

A Soldier in the field prepares a hot cup of coffee using a re-sealable Hot Beverage Bag.

Show me the muscle

The U.S. Army Research Institute of Environmental Medicine (USARIEM) is studying potential weight and muscle loss in Soldiers fighting in Afghanistan

By Jane Benson
Editor

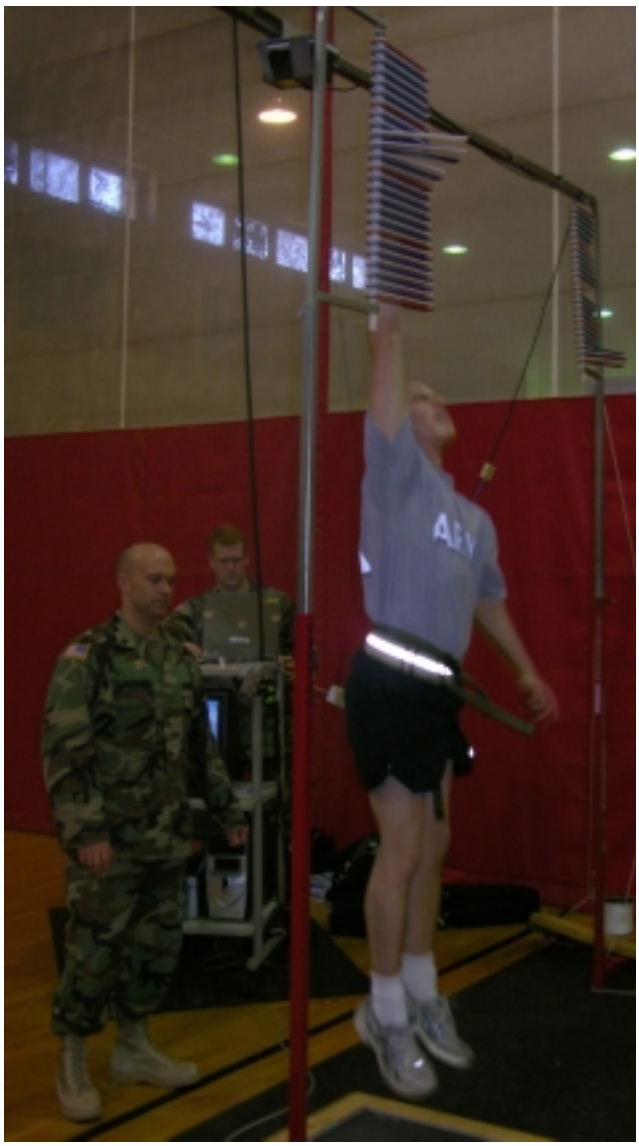
The U.S. Army Research Institute of Environmental Medicine (USARIEM), along with the U.S. Army Center for Health Promotion and Preventive Medicine (CHPPM) and the Army Physical Fitness School, has initiated a two-phased study to investigate potential weight and muscle loss in Soldiers deployed to Afghanistan.

The formal study has been prompted by Soldier observations and anecdotal evidence of weight/muscle loss, according to Marilyn Sharp, a research health exercise scientist in the Military Performance Division at USARIEM.

In February, Sharp's team, as well as CHPPM and the Army Physical Fitness School, collected data on several hundred Soldiers who were set to deploy to Afghanistan. Upon their return, the Soldiers will be re-assessed to evaluate body composition changes. Some of the Soldiers will be trying out a new fitness program called Physical Readiness Training (PRT).

Courtesy photo

This Soldier has his aerobic capacity measured as part of a series of tests that will be performed before and after deployment to Afghanistan.



Courtesy photo

Spc. Daniel Catrambone and Sgt. Joseph Alemany, both from the U.S. Army Research Institute of Environmental Medicine, test the vertical jump height of a Soldier from the 10th Mountain Division at Fort Polk, La. The jump height, power, and acceleration are measured simultaneously using a Vertec jump system, a force plate, and a ballistic measurement system.

Courtesy photo

Researchers used low-level x-ray equipment to get an accurate measure of body composition to help determine body fat, muscle and bone density.

In Afghanistan, Soldiers are often on the move, carrying heavy loads on physically demanding terrain under high altitude conditions, which can stress the heart and the lungs. The loss of muscle mass and weight could impair the Warfighter's ability to carry out his mission.

Sharp pointed out, "These Soldiers are expending a great deal of energy in a high-altitude environment."

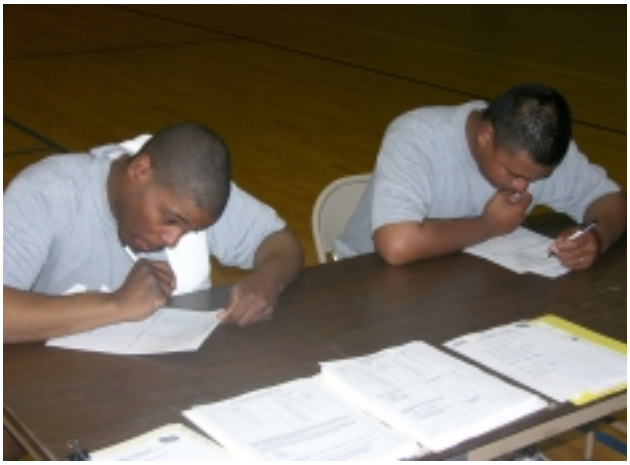
PRT strengthens muscle groups that enable Soldiers to perform their duties more efficiently and with fewer injuries.

During the group's pre-deployment evaluation, USARIEM documented fitness levels and recorded the Soldiers' body mass. The Soldiers were assessed in five areas: aerobic capacity, muscle strength, upper and lower body power, and body composition.

The Soldiers also filled out lifestyle questionnaires to document health-related issues and exercise habits. The questionnaire will track how habits change during deployment and how habits are affected by the new exercise training program.

The data collected from the five fitness tests and from the questionnaire will be used to create a database capturing each Soldier's overall physical condition. The Soldiers will go through the five fitness tests again upon their return.

Scientists anticipate that the Soldiers using the new exercise program will have fewer injuries, increased mobility, and be better able to perform their jobs.



Courtesy photo

Soldiers completed lifestyle questionnaires to record health habits prior to deployment to Afghanistan.

Health tea

Natick Soldier Center and University of Massachusetts-Lowell researchers have uncovered a possible anti-cancer treatment

By Patty Welsh
Public Affairs Office

While working together to find novel ways to replace certain disposable battery components, researchers at the U.S. Army Natick Soldier Center (NSC) and the University of Massachusetts (UMASS)-Lowell made an unexpected discovery: a potential anti-cancer treatment. The researchers were investigating the use of natural, or 'green,' materials to provide power sources for the Soldier of the future.

The researchers have adopted a totally 'green' protocol, funded as an Environmental Quality Basic Research (EQBR) pollution prevention project, to make new molecules for electronic devices. One of the compounds that they were studying was catechin, a component in green tea that is being evaluated as a cancer inhibitor by leading scientists in the field of oncology.

NSC and UMASS-Lowell scientists were able to link several of the molecules together to make a small "oligomer" with the objective to make a better battery electrolyte. Although it was not found to be promising for battery applications, the compound appears to be very successful in inhibiting the growth of cancerous cells in tissue culture experiments. The effectiveness that is being shown is "incredible" according to Dr. Ferdinando Bruno, research chemist, NSC.

"The catechin oligomer compounds have been shown to be effective in killing breast, stomach and neck cancer cells, in tissue culture, with approximately 90, 75 and 50 percent inhibition, respectively," Bruno stated.

Another amazing result is that while these compounds inhibit the growth of cancer cells, they do not affect the growth of normal cells. This is in striking contrast to traditional cancer drugs or treatments being used today. The current methods also adversely affect healthy cells in the course of killing cancerous ones.

An important part of this research involves the use of enzymes to make novel compounds. Dr. Lynne Samuelson, a research chemist from NSC and a pioneer of enzymatic template polymerization, suggested increasing the water solubility of these novel compounds by tethering them to a large molecule called polystyrene sulfonate. This templated reaction made the naturally occurring catechin oligomer longer lived and more water soluble, but the modified compound was still not effective against cancer cells at doses that could be administered to humans.

"Natick Soldier Center (NSC) and University of Massachusetts (UMASS)-Lowell have created a compound that appears to be very successful in inhibiting the growth of cancerous cells in tissue culture experiments. The effectiveness that is being shown is "incredible", according to Dr. Ferdinando Bruno, research chemist, NSC.

Jayant Kumar, director of the Center for Advanced Materials at UMASS-Lowell, then suggested adding ethanol, an alcohol, to try to make the compound more efficient. While growing up, Bruno attended Jesuit schools in Italy. He remembered the fountains in the schools' cafeterias filled with both water and wine and suggested adding 10 percent ethanol to the solution, which appears to be the correct combination. This was a key to the development of the new anti-carcinogens and made these new compounds effective at very low doses.

Warrior/Underhill

While investigating a green tea component as a novel way to replace certain disposable battery components, Natick Soldier Center and University of Massachusetts (UMASS)-Lowell scientists instead discovered a potentially effective cancer cell growth inhibitor.

Another amazing result is that while these compounds inhibit the growth of cancer cells, they do not affect the growth of normal cells . . .The current methods also adversely affect healthy cells in the course of killing cancerous ones.

With increased stability and effectiveness, this family of compounds is now being tested for its efficacy against a wide variety of different human cancers by another UMASS collaborator, Dr. Susan J. Braunhut, and her team. This research is now being funded by the Department of Defense Breast Cancer Program. With the help of Dr. Ramaswamy Nagarajan, additional funds were obtained from the Environmental Protection Agency in the form of an award to a graduate student, Subhalakshmi Nagarajan, at UMASS-Lowell. A patent application has been filed, and the next step will be to try to continue the research in vivo, with living organisms, with results hopefully just as positive.

"Over the next year," Bruno said, "we plan to begin testing in mice for the drug's effectiveness against transplanted human tumors."

He added, "There are many other types of catechins, for instance, those that are found in white tea. We have only touched the surface."

This has been a "good collaboration" between UMASS-Lowell and NSC, according to Bruno, and although this is definitely not part of NSC's mission, Bruno said he sees the research as "totally revolutionary, with an incredible future."

A zeal for great meals

Driven by Warfighter preferences, DoD Combat Feeding Directorate keeps improving and adding items to Meals, Ready-to-Eat (MREs)

By Jane Benson
Editor

Driven by Warfighter preferences, DoD Combat Feeding Directorate keeps improving and adding items to Meals, Ready-to-Eat.

The nation's Warfighters can look forward to numerous new food items and improvements in the next version of Meals, Ready-to-Eat (MREs), which were recently approved and will go into production in 2008.

MREs were developed by the DoD Combat Feeding Directorate (CFD), part of the Natick Solider Center, in the early 1980s. The CFD has since worked continuously to update the meals to provide optimum nutrition, improve taste, and to reflect the current preferences of servicemen and women. The meals meet the Office of the Surgeon General's nutritional requirements and are packaged to withstand airdrop, rough handling, and temperature extremes. Items included in the MRE must be shelf stable for three years at 80 degrees Fahrenheit and six months at 100 degrees Fahrenheit.

MREs are used to sustain individuals in all the Armed Forces during operations where meal preparation is not feasible. The meals include 24 different menus.

The new items and replacements are the result of extensive evaluations with the very people who will be eating the meals, the nation's Warfighters. Thirty-eight new items were evaluated by approximately 400 Soldiers at Fort Greeley, Alaska, in September 2005.

According to Judy Aylward, a CFD senior food technologist and project officer for the Fielded Individual Ration Improvement Program, new items must receive a score of 6 or higher on a quality scale of 1 to 9 (with 1 being extremely disliked and 9 being extremely liked) to be included in the annual field evaluation.

Results from the field evaluations, combined with recommendations by Natick Soldier Center scientists, were presented for approval to the Joint Service Operational Rations Forum, which included representatives from all of the Armed Services, in February 2006.

Aylward has noticed changes in Warfighter preferences over the years.

"We have seen a trend in the past several years that the Warfighters tend to like ethnic foods, sandwich-type items, and eat-on-the-move snack items. They also are more health conscious and read the food labels. All MRE items have the Food and Drug Administration (FDA) food label, which includes nutritional information and ingredients," said Aylward.

"Name brand recognition provides a little bit bit of home to the Warfighter, which especially helps to improve morale." Judy Aylward, senior food technologist, DoD Combat Feeding Directorate, commenting on how Combat Feeding tries to incorporate some commercial-off-the-shelf items into Meals, Ready-to-Eat.

"We have seen a trend in the past several years that the Warfighters tend to like ethnic foods, sandwich-type items, and eat-on-the-move snack items. They also are more health conscious and read the food labels." Judy Aylward, senior food technologist, DoD Combat Feeding Directorate.

Aylward said the following items were approved to be included in MREs:

Granola with blueberries or strawberries (just add water and you will have a bowl of granola with milk)
Instant vanilla or chocolate pudding
Toaster pastries, chocolate chip or French toast
Chipotle snack bread
Chocletto's candy (chocolate toffee candy)
Twizzler Nibs (small red licorice candy)
Chocolate-covered coffee beans
Patriotic cookies (sugar cookie with flags/Soldiers imprinted on surface)
Cheez-Its, hot and spicy
Irish Cream flavored coffee
Banana strawberry dairy shake
Salsa verde (condiment)
Butter Buds
Splenda packet (sugar substitute)

Some items from previous editions of the MRE will be replaced. Chicken pesto pasta will replace the chicken with cavetelli. Lasagna with vegetables, a vegetarian meal, will replace the vegetarian manicotti.

CFD also tries to include commercial-off-the-shelf products in MREs when possible.

"Name brand recognition provides a little bit of home to the Warfighter, which especially helps to improve morale," said Aylward.

According to Aylward, this next version of the MRE will go into production in 2008 and will be available in the field by 2009 or 2010.

Warrior/Underhill

A Soldier in the field eats a Meal, Ready-to-Eat (MRE). The nation's Warfighters can look forward to numerous new food items and improvements in the next version of the MRE.

Kudos corner

Awards

Retired Natick Soldier Center senior research scientist receives the Presidential Rank Award for Meritorious Senior Professional

Dr. Herbert Meiselman, a recently retired Senior Research Scientist in Behavior and Performance located at the Natick Soldier Center, has received the Presidential Rank Award for Meritorious Senior Professional. Meiselman is recognized nationally and internationally for his expertise in applying his extensive knowledge of behavioral psychology and experimental design to advancing consumer research techniques that led to enhanced Soldier items (clothing and individual equipment, combat rations and field feeding equipment, and personnel and cargo airdrop systems).

His novel approaches to conducting research represent a paradigm shift and have been critical to the success of the Soldier as a System concept and in the fielding of items that Soldiers can and will use.

Meiselman has demonstrated extraordinary national and international leadership in the area of food and behavior research by focusing on the Soldier as consumer. Meiselman worked at the Natick Soldier Center from 1969-2005.

The President's Rank Awards recognize strong leaders, professionals and scientists for their exceptional long-term accomplishments and for their strength, integrity, industry, and relentless commitment to excellence in public service.

NSC, USARIEM and TARDEC win Army Laboratory Collaboration Award

The Natick Soldier Center (NSC), the U.S. Army Research Institute of Environmental Medicine (USARIEM), and the U.S. Army Tank-Automotive Research, Development and Engineering Center (TARDEC) received the Army Laboratory Collaboration Award for providing microclimate cooling for the Up-Armored High-Mobility Multipurpose Wheeled Vehicle (HMMWV) occupants. The NSC/USARIEM/TARDEC effort met an urgent battlefield requirement.

In a personal note, a helicopter pilot in Iraq emphasized the importance of microclimate cooling to aviators:

"I wanted to thank you and everyone else that had a part in getting us the Microclimate Cooling System. I just got back from my first flight with it a couple of hours ago. We flew 5.5 hours in 120 degrees and it worked awesome. The crew agreed this system is the best thing we've done for the helicopter since we put a rotor on it!!! The system greatly enhances the crew's comfort and significantly reduces fatigue.

I flew a similar mission two days ago w/out the system and I can personally attest that the heat is becoming our most dangerous threat. Without the system, after only a couple hours of flying you find yourself fatigued and droning. Whereas today, the crew was as fresh after 5.5 hours as when we first strapped it on. Bottom line: This is an awesome system that greatly reduces the risks levels to our Soldiers over here. Again thank you all for your support; it is making a difference in the fight!"

Warrior/Underhill

Patents

Patent Issued: 7,013,579 B2

Date: March 21, 2006

Inventors: Stephen Szczesuil and Michael Holthe

Title: Article of Footwear with Temperature Regulation Means

Description: Article of footwear includes a sole, an insole overlying the sole, the insole having in a surface thereof a groove having an inlet and outlet in an edge of the insole, the groove winding substantially throughout the length and width of the insole upper surface.

Patent Number: 7,011,781 B2

Date: March 14, 2006

Inventors: Stephen Szczesuil and Michael Holthe

Title: Method of Producing an Article of Footwear with Temperature Regulation Means

Description: The invention relates to footwear and is directed more partuiculary to an article of footwear with temperature regulation means.

Patent Number: 7,001,996 B1

Date: February 21, 2006

Inventor: Lynne Samuelson and Ferdinando Bruno

Title: Enzymatic Template Polymerization

Description: The invention relates to a composition of matter in which a substituted or unsubstituted polyaniline is bound to a polynucleotide as a complex.

Patent Number: 6,981,449

Date Issued: January 3, 2006

Inventor: James E. Sadeck

Title: Projectile Launch Assembly and Method

Description: The invention relates to the launching of small projectiles, and more specifically is directed to an assembly and method for launching such projectiles from firearms, such as rifles.

Patent Number: 6,981,339

Date Issued: January 3, 2006

Inventor: Stephen Szczesuil and Michael Holthe

Title: Article of Footwear with Temperature Regulation Means

Description: The invention relates to footwear and is directed more particularly to an article of footwear with temperature regulation means.

If you would like to submit news regarding an award, patent, or other accomplishment, please email IMNE-SSC-PA@natick.army.mil. *Items are run on a space-permitting basis and are subject to editing.*

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